

Solid composition containing bonds which can be activated with actinic radiation, and its use

Claims

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1. A solid composition comprising

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(A) at least one solid (meth)acrylate copolymer with a number-average molecular weight of from 850 to 10 000 and a molecular weight polydispersity Mw/Mn of from 1.0 to 5.0, containing at least one group (a) having at least one bond which can be activated with actinic radiation;

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and

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(B) at least one solid compound comprising a parent structure and, attached thereto, on average per molecule more than one group (a) having at least one bond which can be activated with actinic radiation.

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2. The solid composition as claimed in claim 1, characterized in that the (meth)acrylate copolymer (A) is preparable by

(1) radical high-temperature polymerization of

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(m1) at least one methacrylate and

(m2) at least one monomer copolymerizable  
therewith, with

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(m3) from 5.0 to 50 mol% of the total amount  
of monomers (m1) and (m2) being monomers  
which carry nonpolymerizable reactive  
functional groups (b); and

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(2) polymer-analogous reaction of the resulting  
methacrylate copolymer, which carries at  
least one reactive functional group (b), with


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(m4) at least one compound containing at  
least one bond which can be activated  
with actinic radiation and at least one  
reactive functional group (c) which is  
complementary to the group (b),

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to give the group (a).

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 3. The solid composition as claimed in claim 1 or 2,  
characterized in that the bonds which can be  
activated with actinic radiation comprise carbon-  
hydrogen single bonds or carbon-carbon, carbon-  
oxygen, carbon-nitrogen, carbon-phosphorus or  
carbon-silicon single bonds or double bonds,  
especially carbon-carbon double bonds.

5. The solid composition as claimed in claim 4,  
15 characterized in that the groups (a) are  
(meth)acrylate groups, especially acrylate groups.

7. The solid composition as claimed in any of claims  
1 to 6, characterized in that the groups (a) in  
the compound (B) are attached to the parent  
structure by way of urethane, ester, ether and/or  
amide groups.

8. The solid composition as claimed in claim 7, characterized in that the groups (a) in the compound (B) are attached to the parent structure by way of urethane groups.

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9. The solid composition as claimed in any of claims 1 to 8, characterized in that the compound (B) is amorphous, partly crystalline, or crystalline.

10 10. The solid composition as claimed in any of claims 1 to 9, characterized in that the compound (B) has a melting range or melting point in the temperature range from 40 to 130°C.

15 11. The solid composition as claimed in any of claims 1 to 10, characterized in that the compound (B) has a melt viscosity at 130°C of from 50 to 20 000 mPas.

20 12. The solid composition as claimed in any of claims 1 to 11, characterized in that the parent structure of the compound (B) is of low molecular mass, oligomeric and/or polymeric.

25 13. The solid composition as claimed in claim 12, characterized in that the oligomeric and/or polymeric parent structure of the compound (B) contains olefinically unsaturated double bonds.

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Sub  
A3

Sub  
A4

14. The solid composition as claimed in claim 12 or 13, characterized in that the oligomeric and/or polymeric parent structure is derived from random, alternating and/or block, linear, branched, hyperbranched, dendrimeric and/or comb polyaddition resins, polycondensation resins and/or addition (co)polymers of ethylenically unsaturated monomers.

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10 15. The solid composition as claimed in claim 14, characterized in that the addition (co)polymers are poly(meth)acrylates and/or partially hydrolyzed polyvinyl esters and the polyaddition resins and/or polycondensation resins are

15 polyesters, alkyds, polyurethanes, polyester-polyurethanes, polylactones, polycarbonates, polyethers, polyether-polyesters, epoxy resin-amine adducts, polyureas, polyamides or polyimides, especially polyesters, polyester-polyethers, polyurethanes, and polyester-polyurethanes.

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Sub  
A5

16. The solid composition as claimed in any of claims 1 to 15, characterized in that the methacrylate copolymer (A) and/or the compound (B) comprise at least one chemically bonded stabilizer (e).

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17. The solid composition as claimed in claim 16, characterized in that a HALS compound is used as

chemically bonded stabilizer (e).

18. The solid composition as claimed in claim 17,  
characterized in that the 2,2,6,6-tetramethyl-  
5 piperidine-N-oxide-4-oxy group is used as  
chemically bonded HALS compound (e).

19. The solid composition as claimed in any of claims  
16 to 18, characterized in that the chemically  
10 bonded stabilizer (e) is present in the solid  
compound (B).

20. The solid composition as claimed in any of claims  
1 to 19, characterized in that the compound (B)  
15 contains reactive functional groups (c) which are  
able to undergo thermal crosslinking reactions  
with groups (c) of its own kind and/or with  
complementary functional groups (b) which are also  
present in the methacrylate copolymer (A) and/or  
20 in at least one crosslinking agent.

21. The solid composition as claimed in any of claims  
1 to 20, characterized in that the methacrylate  
copolymer (A) and/or the compound (B) comprises  
25 chemically bonded photoinitiators and/or  
photocoinitiators.

22. The use of the solid composition as claimed in any  
of claims 1 to 21 as coating materials, adhesives

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Spk  
H6

or sealing compounds which can be crosslinked thermally and/or with actinic radiation, or to produce coating materials, adhesives or sealing compounds which can be crosslinked thermally and/or with actinic radiation.

23. Coating materials, adhesives or sealing compounds comprising at least solid composition as claimed in any of claims 1 to 21.

24. The coating materials, adhesives or sealing compounds as claimed in claim 23, characterized in that at least one further constituent curable with actinic radiation is present therein.

25. The coating materials, adhesives or sealing compounds as claimed in claim 24, characterized in that the further constituent is selected from the group containing other (meth)acrylate-functional (meth)acrylic copolymers, polyether acrylates, polyester acrylates, unsaturated polyesters, epoxy acrylates, amino acrylates, melamine acrylates, silicone acrylates, and the corresponding methacrylates.

26. The coating materials, adhesives or sealing compounds as claimed in claim 25, characterized in that the unsaturated polyester is selected from the group containing amorphous, partly crystalline

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and crystalline solid polyesters containing at least one terminal group which derives from the adduct of dicyclopentadiene and maleic anhydride in a molar ratio of 1:1, and/or at least one endomethylenetetrahydrophthalic acid group.

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27. The coating materials, adhesives or sealing compounds as claimed in any of claims 23 to 26, characterized in that at least one further additive is present therein.

28. The coating materials, adhesives or sealing compounds as claimed in any of claims 23 to 27, characterized in that they are present as powders, powder slurries, or a solution or dispersion in organic solvents.

29. The use of the coating materials, adhesives or sealing compounds as claimed in any of claims 23 to 28 to produce coatings, adhesive films or seals for primed or unprimed substrates.

30. A process for producing coatings, adhesive films or seals for primed or unprimed substrates, wherein

(1) at least one coating material and/or adhesive and/or at least one sealing compound as claimed in any of claims 23 to 28 in the form

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Sub  
#7



of

- 5
- (1.1) a melt,
  - (1.2) a powder,
  - (1.3) a powder slurry or
  - (1.4) a dispersion or a solution in at least one organic solvent

10 is applied to the primed or unprimed substrate,

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- (2) the resulting powder slurry film (1.3) or the resulting film of a dispersion or a solution (1.4) is dried or the resulting film of the melt (1.1) is caused to solidify or is maintained in the melted state by heating,

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- (3) the resulting solid film (1.2), (1.3) or (1.4) is melted by heating, and

- (4) the melted film which results in process step (2) or (3),

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- (4.1) in the melted state,
  - (4.2) on solidification and/or
  - (4.3) after solidification.

is cured with actinic radiation.

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31. The process as claimed in claim 30, characterized in that the film is thermally cured by heating before, during or after process step (4).

5 ~~32. The process as claimed in claim 30 or 31, characterized in that heating is carried out with near infrared (NIR) light.~~

10 ~~33. Coatings, adhesive films or seals on primed or unprimed substrates, produceable from coating materials, adhesives or sealing compounds as claimed in any of claims 23 to 28 and/or produceable by means of the process as claimed in any of claims 30 to 32.~~

15 ~~34. Primed and unprimed substrates, especially bodies of automobiles and commercial vehicles, industrial components, including plastics parts, packaging, coils and electrical components, or furniture,~~  
20 ~~comprising at least one coating, at least one adhesive film and/or at least one seal as claimed in claim 33.~~

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